Article

Visual and Artefactual Approaches in Engaging Teachers with Multilingualism: Creating DLCs in Pre-Service Teacher Education

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Abstract: This paper reports on a study of teachers' engagement with their own multilingualism in a pre-service teacher education context. As linguistic diversity in society and schools around the globe is increasing, teachers are required to meet the challenges of teaching children who live with multiple languages. However, teachers are seldom required to reflect on and engage with their own multilingualism, which forms the basis of a subjective and experiential approach to educating teachers multilingually. Embedded in an arts-based visual methodology, this study used the concept of Dominant Language Constellations (DLCs) as both a theoretical underpinning and a creative qualitative tool for collecting data. It included fourteen DLC artefacts created by future teachers of English in Grades 1–7 and Grades 5–10 in northern Norway, supported by oral and written narratives. Plurisemiotic analysis of teachers' DLC artefacts indicates that teachers 'saw' or perceived themselves as plurilingual individuals for the first time. Furthermore, they reflected on the classroom implications of including multilingual practices in a context of increasing linguistic diversity in Norway, through capitalizing on their own and potentially their learners' multilingual identities.

Keywords: multilingualism; DLC (dominant language constellation); language repertoires; teacher education; ELT (English language teaching); visual arts-based methodologies

1. Introduction

This paper reports on a study conducted in a pre-service teacher education English programme as part of a five-year Master's in primary (Grades 1–7) and secondary (Grades 5–10) education in Norway. Based on the theoretical perspective of multilingualism as 'lived or subjectively experienced' (Kalaja and Pitkänen-Huhta 2018, p. 15) and embedded in the 'visual turn' (Kalaja and Melo-Pfeifer 2019, p. 4), this study investigated pre-service teachers' engagement with their own multilingual repertoires via visual and creative methods. Aronin's (2006, 2019b) construct of the Dominant Language Constellation (DLC) as a theoretical and research approach underlies the methodological choice of an artefactual, hence concrete, visualization of the student teachers' languages. The study included fourteen DLC artefacts from three groups of student teachers, two in the first year of English Grades 1–7 and one in the fourth year of Grades 5–10. Consequently, this study heeds the call for pedagogical applications of DLC research and constitutes an innovative approach to engaging and describing individuals' complex repertoires of languages, linguistic competences, and identities.

1.1. Multilingualism in Education

Multilingualism is neither an exception nor a new phenomenon. Edwards (1994, p. 1) described it as 'a normal and unremarkable necessity' for individuals and societies. More recently, Aronin and Singleton (2008, 2012) and Aronin (2019a, pp. 26–27) have called for 'a new linguistic dispensation' based on 'an unparalleled spread of the use of English as an international language [and] a remarkable diversification of the languages in use', where

flexible language practices include 'monolingual, bilingual, and multilingual arrangements'. This increase in linguistic diversity is evident in the Norwegian context, which has been described by Lanza (2020, p. 131) as a 'linguistic paradise' as a result of a certain tolerance of linguistic diversity that is evident in policy, curriculum renewal processes, and attitudes towards multilingualism. Not only have Norwegian schools become more culturally and linguistically diverse because of immigration to the country and an increase in the number of children born in Norway to immigrant parents (18.5% according to Statistics Norway 2021), but Norwegian society has recently become more open to accommodating a mosaic of languages. The indigenous languages Sami, Kven, Romani, and Romanes have official status as national minority languages, as does Norwegian Sign Language; there are two written forms of Norwegian, Bokmål and Nynorsk, and a multitude of spoken dialects across the country (Vikøy and Haukås 2021).

Globally, national curricula are increasingly integrating references to linguistic diversity, as exemplified by two northern European countries. The Finnish and Norwegian curricula both refer explicitly to linguistic diversity, and the term 'multilingual' or 'multilingualism' appears in both. The Finnish National Agency for Education emphasises an 'Awareness of languages in general and appreciation of multilingualism and multiculturalism' (Finnish National Agency for Education 2014; Kalaja and Pitkänen-Huhta 2020, p. 6), while the Norwegian Directorate of Education and Training (2020), English curriculum (Læreplan i engelsk) states, 'Pupils should be given a basis for seeing their own and the identity of others in a multilingual and multicultural context' (p. 3). However, Kalaja and Pitkänen-Huhta (2020, p. 7), when analysing the Finnish curriculum, lament the fact that references to multilingualism remain 'at the level of buzzwords and lack any concrete applications', as curricula do not come with how-to manuals. Although references to multilingualism and linguistic diversity are much-needed and welcome additions to national curricula and educational policy, there is a scarcity of concrete guidelines for teacher training with elements of plurilingual pedagogy (Otwinowska 2014, p. 307).

Several studies in Norway have highlighted the positive attitudes of teachers towards the phenomenon of multilingualism (Haukås 2016). However, there is little evidence of teachers integrating plurilingual practices in their teaching. For example, Pran and Holst (2015) revealed that only three out of ten teachers in Grades 1–10 have at some point carried out activities on the topic of multilingualism with their classes. A survey carried out among 176 teachers of English showed that only 5% believed they were very well qualified to teach in multilingual classrooms (Krulatz and Dahl 2016). Despite a high level of qualifications and well-intentioned attitudes towards multilingualism and L1 activation, the teachers in Burner and Carlsen's (2019) study, working in a school for newly arrived students, struggled to implement multilingual teaching practices. Instead, they prioritised the learning of Norwegian over the L3 (English) for integration purposes, even though English is a compulsory subject in the Norwegian curriculum. Similarly, the teachers in a longitudinal study by Lorenz et al. (2021) supported the idea of integrating multilingual practices, but they did not implement such practices systematically. Hence, recent research into teachers' perceptions and practices in Norway has confirmed that there is still a need to educate teachers who understand and can knowledgeably use multiple languages and multilingual teaching practices in their classrooms in general and in the English classroom in particular.

In calling for a greater focus on multilingualism and plurilingual practices in teacher education, researchers and educators in different contexts have also been considering what teachers need to learn about the phenomenon. Firstly, as no one language fulfils an individual's full communicative, cognitive, or emotional requirements, it is imperative for teachers to understand multilingualism as a complex, dynamic, shifting, and multidimensional phenomenon (Ibrahim 2022; Jessner 2013; Cenoz and Gorter 2011, 2015). According to Otwinowska (2014, 2017), teachers should develop an awareness of crosslinguistic, metalinguistic, and psycholinguistic knowledge concerning multiple language acquisition. García and Kleyn's (2019) three-strand approach includes knowledge of the children and their

families, knowledge of bi/multilingualism, and knowledge of appropriate plurilingual pedagogies. However, not only do individuals seldom identify as multilingual as a result of monolingualizing processes that have penetrated and structured education systems and ideologies, but they are rarely encouraged to explore their personal engagement with multilingualism. A focus on multilingual practices in teacher education can contribute to positive attitudes towards multilingualism (Portolés and Martí 2020; Haukås 2016), but identity-based approaches, where teachers actively go through a process of identification as multilingual, are also proving to be effective (Krulatz and Xu 2021). Ibrahim (forthcoming) argues that teachers need to develop an understanding of multilingualism as subjectively lived or experienced, 'involving positive and negative emotions, attitudes, beliefs, visions and identities' (Kalaja and Melo-Pfeifer 2019, p. 1). This personal and subjective approach constitutes key first steps in 'raising the critical awareness amongst teachers and teacher trainers of their own multilingual background, their own learning trajectories and their own attitudes toward plurilingualism and plurilingual practices' (Wei 2020, p. 274).

1.2. Arts-Based Approaches in Teacher Education

Even though researchers have employed a variety of traditional tools, such as interviews, narratives, and discourse analysis, there has been a strong 'lingualism' (Block 2014) bias in investigating the multilingual phenomenon. The more recent focus on visual and multimodal/artefactual methods affords research into teacher education and multilingualism interesting new avenues. Whitelaw (2019, p. 7), developing the concept of critical aesthetic practice, foregrounds the role of the arts in developing an awareness and understanding through sensory experiences that allow for thinking, seeing, feeling, and perceiving differently. Arts-based practices open up a safe, creative space for engaging with linguistic repertoires and exploring teachers' and students' identity connections with their linguistic histories and biographies (Busch 2018; Blommaert and Backus 2013; Barkhuizen and Strauss 2020). They bring to the classroom different ways of being, which disrupt the verbocentric status quo (Kendrick and McKay 2002, 2009) and provide a transformative lens through which to re-envision language education. Arts-based approaches personalise the learning process and provide more opportunities for inclusive practices, as they allow for a 'certain freedom and spontaneity' (Lähteelä et al. 2021, p. 21) in appropriating the tools for self-expression related to experience, action, and emotion.

Researchers and practitioners have been engaging with the visual turn in teacher education in innovative ways. Kalaja and Melo-Pfeifer (2019) gathered thirteen studies using a variety of visual methods (drawings, photos, objects, artefacts) across different contexts, including teacher education. For example, the four case studies in Part 3: Multilingual Teacher Education (pp. 197–274) used drawings to explore the participants' future selves as teachers of English in linguistically diverse contexts. Even though these studies did not engage directly with the teachers' perceptions of themselves as multilingual individuals, Pinto (2019, p. 229) did highlight the 'discovery of their own 'pluringuality', or their ability to think, be(come), and act plurilingually as teachers of EFL. Hirsu et al. (2021) described a project in which researchers, teachers, and artists worked together to operationalise translingual practices in the classroom by side-lining the complex definition of translanguaging. They adopted a creative arts-based approach, in which students used their full range of semiotic resources, highlighting the 'creative and critical dimension' (Wei 2018, p. 13) of multilingualism. Teachers' conversations around those visuals, both individually and collaboratively, also proved to be meaningful in deepening discussions around teacher identity construction (Orland-Barak and Maskit 2017, p. 28).

Aronin and Ó Laoire (2013, p. 225) call for a greater focus on 'the material culture of multilingualism' and argue that 'a deliberate focus on the study of materialities (artefacts, objects, and spaces) can contribute significantly to the investigation of multilingualism'. Ibrahim (2019, 2021) combined visual and artefactual elements in exploring children's identity, where the multimodal text goes beyond the 'predominantly verbal' and 'accommodates the interplay of different semiotic modes and recognises the complexity of multimodal

narrative meaning' (Page 2010, p. 115). Using drawings and selected objects to represent their languages, children described multiple and erratic language trajectories, where repertoires become 'biographically organised complexes of resources [that] follow the rhythms of human lives' (Blommaert and Backus 2011, p. 9). Barkhuizen et al. (2014) privileged the term multimodal narratives (such as drawings, photographs, videos, digital stories, etc.) to highlight the multidimensionality of this representation resource. In this study, student teachers created a concrete visual artefact of their language repertoires and DLCs, constituting a 'powerful tool for delving into participants' feelings, attitudes and perceptions about the self' (Ibrahim 2019, p. 48). The current study heeds the call for pedagogical applications of DLC research by embedding DLCs in artefactual, multimodal practices in researching teacher education.

1.3. Dominant Language Constellations (DLCs) as a Research and Pedagogical Approach

The concept of the DLC (Aronin 2006, 2016; Lo Bianco and Aronin 2020; Aronin and Vetter 2021) was developed in an attempt to capture the complexity, multidimensionality, and unpredictability of contemporary multilingual communication. The DLC bridges the hypothetical monolingual perspective, where individuals only need one language to function on a daily basis, and the multilingual perspective, where a full language repertoire consists of a 'long list of skills in many languages accumulated with the help of mobility, new media and technologies' (Aronin 2019b, p. 20). Aronin (2019b, p. 21) defines an individual's DLC as 'the group of a person's most expedient languages, functioning as an entire unit and enabling an individual to meet all his/her needs in a multilingual environment'. While a language repertoire refers to 'the totality of linguistic skills in all the languages possessed by an individual or by a community and may include several languages, a Dominant Language Constellation captures only a subset of them (typically but not always three languages) that are deemed to be of prime importance' (Aronin and Moccozet 2021, p. 2). However, as argued by Coetzee-Van Rooy (2018), 'a single dominant language constellation' (p. 25) is unrealistic in certain contexts, and the division between language repertoires and DLCs may be more porous than first identified. Hence, it makes more sense to consider the 'co-existence of several 'dominant language constellations' in the "language repertoires" of people' (p. 24), where the apparently lesser-used languages in a repertoire gain importance, visibility, and functionality in different domains; for example, different languages contribute to a family DLC, a professional DLC, or a leisure DLC. This highlights the nature of DLCs as unstable, evolving, and fluctuating as a result of political changes, group and individual migration, and new life circumstances (Krulatz and Dahl 2021).

Even though the DLC emerged as a theoretical concept, it is now being operationalised in various contexts. For example, Nightingale's (2020) study focused on an individual's language use and 'how his most expedient languages are reconfigured according to the multilingual environment and how they relate to his emotions, language attitudes, and identity construct' (2020, p. 232). This study captured not only the functional aspects of the individual's DLC but also his affective and emotional ties to the various languages.

More recently, the concept of the DLC has been employed in education and teacher training. Coetzee-Van Rooy (2018) investigated the DLCs of urban South African youth to create and contribute to more effective multilingual language-in-education policies and practices. Björklund and Björklund (2021) used individual and institutional DLCs within the teaching practicum as part of the teacher education programmes at Åbo Akademi University in Finland as a tool to uncover the multiple layers of DLCs in organizations. Krulatz and Dahl (2021) and Vetter (2021) both took a language policy perspective: the former compared 'the actual and imagined DLCs of refugees to Norway with the majority communal DLC in Norway and the imagined DLCs that are envisioned for refugees by the government, educational institutions, and communities of settlement' (p. 115), while the latter analysed school language education policy in urban secondary schools. Yoel (2021) investigated the evolution of the DLCs of immigrant (Russian) teacher trainees of English in Israel. Although they used English as a 'pivot language' (p. 158) that allowed

them to negotiate initial access to Israeli society, the objective was to learn Hebrew in order to integrate. As a result, their individual and community DLCs underwent a process of transition and reconfiguration, as Hebrew occupied a more prominent position and English became their professional language.

1.4. DLC Maps and Modelling: Visual and Concrete Representations of Subjectively Lived Multilingualism

The original visual representation of DLC maps reflected a constellation in the night sky, with stars representing the different languages (Aronin 2019b; Lo Bianco and Aronin 2020; Aronin and Vetter 2021). At the XIth International Conference on Third Language Acquisition and Multilingualism in Lisbon (Aronin 2018), the author of this article discovered 3D DLC modelling with plasticine and sticks (Figure 1), an activity that provided physical, tactile, and creative engagement with her DLC. As Aronin and Moccozet (2021) stated, external concrete representations 'boost cognition by shortcutting analytic processes, saving internal memory, creating persistent referents and providing structures that can serve as a shareable object of thought' (pp. 5–6). Hence, a '3D plasticine model of a personal DLC serves as both a cognitive extension and a material symbol of one's own sociolinguistic existence and the language skills that ensure this existence' (Aronin and Moccozet 2021, p. 7). This approach to exploring DLCs affords individuals deeper, more personal connections with their language repertoires and DLCs, thus enhancing self-awareness of multilingualism as a concept and of themselves as multilingual individuals. The plasticine models, in different colours and sizes, uncover the relationships, map the journeys, and reveal the identities that individuals ascribe to their languages.
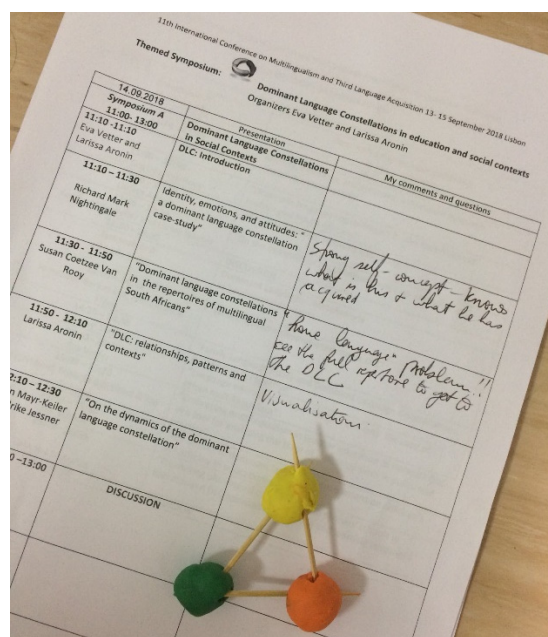
Figure 1. Author's DLC model created at the XIth International Conference on Third Language Acquisition Multilingualism in Lisbon (Aronin 2018) and reproduced in Aronin (2021).

Visualization methods, such as DLC maps, plasticine models, and computer-assisted modelling (Aronin and Moccozet 2021), offer teacher educators a promising tool for exploring student teachers' relationships with their languages and their individual perceptions of the role of these languages in their lives, and for reflecting on the impact this may have on their future practice. The present study employed an innovative approach, in which the student teachers (henceforth STs) created artefactual representations of their full linguistic repertoires and naturally occurring DLCs in a free and spontaneous activity.

2. Materials and Methods

2.1. Aim of the Study

The aim of the study was to investigate STs' perceptions of multilingualism and engagement with their linguistic repertoires by creating an artefact that encapsulated all of their languages and highlighted their DLCs and by reflecting thereon. Heeding the call for pedagogical applications of DLCs and via an innovative and agentic approach, this paper investigated the creative process of engaging with STs' full linguistic repertoires and their DLCs as they emerged in the process of creative self-reporting.

The study explored the following questions:

1. How did STs' multimodal creations (artefacts and reflections) of DLC artefacts reveal a hidden multilingualism and a better understanding of their role as future teachers?
2. How did STs' choices in the creative process of making a DLC artefact contribute to exploring and representing subjectively lived multilingualism?

2.2. Context and Participants

This study comprised fourteen DLC artefacts created by three groups of STs enrolled in a Master's Program in Primary and Secondary Education at a university in northern Norway. Two groups of STs (n = 18) were in the first year of their Master's in Grades 1–7 and had chosen English as an elective. These STs had 30 credits of English in a two-year integrated, interdisciplinary course, after which they could teach English in primary school. The third group was in the fourth year of the five-year Master's in Grades 5–10 (n = 10) and had also elected to teach English. They had completed a compulsory 60 credits before choosing to write their thesis in English. The learning and research context was the respective university courses, where the STs were encouraged to explore their language learning experiences and multilingualism. The Grade 1–7 STs experienced plurilingual practices throughout the year, such as translanguaging, tangled translations, comparing languages, and working with bilingual picturebooks (Ibrahim and Prilutskaya 2021). The Grade 5–10 STs took a module on Multilingualism and Plurilingual Practices as part of the 15-credit course Literacy, Diversity, and Intercultural Citizenship in the English Language Classroom, which included the following four sections: Understanding multilingualism: Terminology, definitions, context, and historical background; Understanding multilingualism: A complex, multidimensional phenomenon; Engaging and visualising multilingualism; and Teaching multilingually. The DLC artefact activity was conducted at the beginning of the course as a way to engage STs with their multilingual selves and to prepare them for plurilingual practices. The DLC artefact creation was complemented by a reflective written narrative, in which they were required to address the following questions:

1. How did you organise your DLC and why did you choose this specific shape, materials, colours, etc . . . to represent your languages?
2. How did creating a visual and manual (craft) representation of all your languages, in this specific shape, help you visualise your multilingualism and see yourself as a multilingual individual and multilingual teacher?
3. How do you think this will change the way you approach your students' other languages in your English lessons?
4. How does this manual, visual, multimodal activity support and enhance creative teaching and ensure deep learning in the language classroom?

2.3. Data Collection

The STs were introduced to the concept of language repertoires and DLCs at the beginning of the course. They were provided with an example of the educator's DLC in the form of word cards set out on a table (Ibrahim 2022) and definitions of the terms. They were shown some examples of previous DLC artefacts and were given two weeks to create an artefact that reflected their full language repertoire, within which they highlighted their DLCs. The STs were free to choose any materials, shapes, and colours and were encouraged to create a 2D or 3D manual artefact. The STs then presented their own artefacts to the

class, where they revealed their languages and offered explanations for their choices. After this, they answered the reflective questions in a piece of writing, which they returned by email. The STs were free to create the artefact that best described their relationship with their languages, thus allowing agency in how they self-reported on their multilingualism. Fourteen STs gave consent for the use of their artefacts for research purposes, and ultimately, fourteen original artefacts were collected, as described in Table 1.

Table 1. Description of artefacts created by STs.

Student Teacher	Language Repertoire	DLC	Artefact/Object	2D/3D	Materials Used	Presentation of Languages
ST1	Polish, Norwegian, English, Spanish, French, German, Italian	Norwegian–English–Polish	Tree and foliage	2D	Coloured card, ice-cream sticks, pencil crayons, paint	Written in English on the ice-cream sticks
ST2	Norwegian, English Swedish, Danish, Spanish	Norwegian–English	Apple tree	2D	Coloured card	Written in English on the leaves and apple
ST3	Norwegian, English Danish, Swedish, Icelandic, Italian, Sami	Norwegian–English	Tree and branches	2D	Coloured card, paint	Written in English on the trunk and branches of the tree
ST4	Norwegian, English Swedish, Danish, Spanish	Norwegian–English	Mobile: butterflies	3D	Pleated paper with printed flags, string	Represented by flags
ST5	Norwegian, English Swedish, Danish German, French	Norwegian–English	Mobile: circles and hearts	3D	Coloured card, string	Written in English on the card
ST6	Norwegian, English Swedish, German, Danish	Norwegian–English–Swedish	Hearts: cut-out hearts on card	2D	Coloured card	Written in English on hearts
ST7	Norwegian, English Danish, Swedish, German	Norwegian–English	Hearts: origami nested hearts	3D	Coloured card	Written in English on outside of hearts
ST8	Latvian, Russian, German, English, Norwegian	Norwegian–English–Latvian	Hearts: heart and paper garlands	3D	Coloured card, paper	Written in original language and script
ST9	Norwegian, English, Swedish, Spanish, German, ASL	Norwegian–English	Sky and clouds	2D	White card, colour felt-tip pens	Written in English on clouds

Table 1. *Cont*.

Student Teacher	Language Repertoire	DLC	Artefact/Object	2D/3D	Materials Used	Presentation of Languages
ST10	Norwegian, English, Ukrainian, Russian, French	Ukrainian–Norwegian–English	Planets	2D	Coloured card	Written in English on planets
ST11	Norwegian, English Swedish, Danish, German	Norwegian–English	Matches	2D	Matches, white paper, colour pencils	Written in English above flames
ST12	Norwegian, English Chinese, German, Dutch	Norwegian–English	Book	3D	Cardboard, paper, felt-tip pens	Designated by flags, objects with a sentence or word written in original language
ST13	Latvian, Russian, English, Norwegian, Polish, German, Latin	Latvian–English–Norwegian–Polish	Globe	2D and 3D	White and coloured paper, colour pencils, plastic	Designated by flags, places of learning, languages in English and original script
ST14	Norwegian, English, Swedish, Dutch, Danish	Norwegian–English	Atom	3D	Coloured card, string	Written in English

2.4. Quantifying DLCs within Language Repertoires

Eighteen languages constituted the overall linguistic repertoire of the participants in this study (Table 2), which can be categorised into the following groups: a common Norwegian–English DLC; other Scandinavian languages that are mutually intelligible; foreign languages as offered in Norwegian secondary education; future language learning; other languages learnt as a result of personal choices or circumstances.

Table 2. Number and frequency of languages identified.

Language	Number of Times Language Is Mentioned
Norwegian	14
English	14
Swedish	9
Danish	9
German	9
Spanish	4
French	3
Russian	3
Dutch	2
Italian	2
Latvian	2
Polish	2
Ukrainian	1
Sami	1
Chinese	1
Icelandic	1
Latin	1
ASL	1

2.4.1. Norwegian–English DLC

Norwegian and English appeared as a stable and context-dependent two-language DLC in this Norwegian context. Not only was Norwegian the first language or mother tongue of 70% of the participants, but it was also the language of schooling and the additional language of the STs who had linguistic connections to other contexts, these being Latvian, Polish, Swedish, and Ukrainian, thereby increasing their DLCs to three. Even though English is an elective in the Master's degree, it is a compulsory subject in Norwegian schools from Grade 1. It is ubiquitous in society in general, with easy access to English on television, a very positive attitude towards English, and good levels of the language, as 'English levels in Norway are consistently found to be among the highest in the world' (Krulatz and Dahl 2021, p. 114). These STs, having chosen to teach English, inevitably had this language in their DLCs.

As this was a small sample of participants, it is difficult to generalise how this study contributes to understanding and quantifying DLCs within language repertoires in northern Norway. However, some conclusions can be drawn from the participants' self-reports, as Norwegian and English constituted a stable DLC in all participants.

2.4.2. Scandinavian Languages

The next major group consisted of the Scandinavian languages, Swedish (n = 9) and Danish (n = 9). These were languages to which the participants had easy access as a result of similarities and intercomprehension with Norwegian. Apart from one ST who had family connections in Sweden and had learnt to read and write Swedish as a result, these languages did not appear as part of the STs' DLCs.

2.4.3. Foreign Languages

The third group constituted the foreign languages learnt at school, German (n = 9), Spanish (n = 4), and French (n = 3). The STs generally reported low proficiency levels in these languages and revealed mixed relationships with them, some finding the learning experience positive and others not.

2.4.4. Future Language Learning

The STs also looked to the future and envisaged expanding their linguistic repertoires with further language learning. Two STs mentioned a desire to learn Italian, Icelandic and Sami, or Korean; two simply mentioned their desire to learn more languages, with comments such as 'to be continued' and 'but I want to learn more languages in the future'.

2.4.5. Personal Choice or Circumstances

The fifth group constituted an eclectic collection of languages, mostly appearing in one single ST's artefact, denoting a personal interest in the culture or language (Chinese) or opportunities to study abroad (Dutch). Only one ST mentioned Sami as an 'interesting' language, without any reference to the important place Sami occupies in the Norwegian context.

2.5. Data Analysis

Data were analysed both quantitatively and qualitatively. The quantitative analysis consisted of highlighting the number of languages mentioned across the three groups of STs, the average number of languages in the STs' repertoires and self-report on DLCs, and the groups of languages identified. The qualitative analysis was employed to examine the STs' artefacts and reflections.

The artefacts and written reflections were analysed qualitatively as multimodal meaning-making, where the object, the image, and the written narrative interacted to create one message around subjectively lived multilingualism. Riessman (2007, p. 179) acknowledged that 'just as oral and written narratives cannot speak for themselves, neither can images'. Hence, creating, saying, and showing in an interactive process (Busch 2018)

become the same thing. Artefactual, multimodal analysis is a holistic approach, which meshes the visual and the lingual. The blending of the two modes in this study enhanced their mutual communicative potential and simultaneously expanded the possibilities of exploring and presenting a multilingual identity. In addition, the materials, shapes, colours, and positionings of the DLC artefacts, constituting a metaphorical object, were chosen by the STs to represent their multilingualism from a biographical, educational, and relational perspective. Content analysis was used to identify the STs' connections with their languages, which was divided into the two categories discussed in the next section of this paper: (a) the object chosen and (b) the creative process.

3. Results

3.1. Exploring the Artefact as Subjectively Lived Multilingualism

This section explores, in detail, the structure of the DLCs and the choices the STs made in the creative process. The STs' subsequent explanations of these choices allow for a deeper understanding of the shift to perceiving themselves as multilingual, their relationships with their languages, and the impact on their future teacher identity.

3.1.1. Personal and Symbolic Choices of DLC Artefacts: The Object Chosen

First and foremost, the artefacts created by the STs were unique and reflected their likes and dislikes. For example, one ST chose to create a butterfly mobile because 'Butterflies are beautiful and I think languages are too' (ST4), while another chose an atom to reflect her interest in science (ST14) (Figure 2).
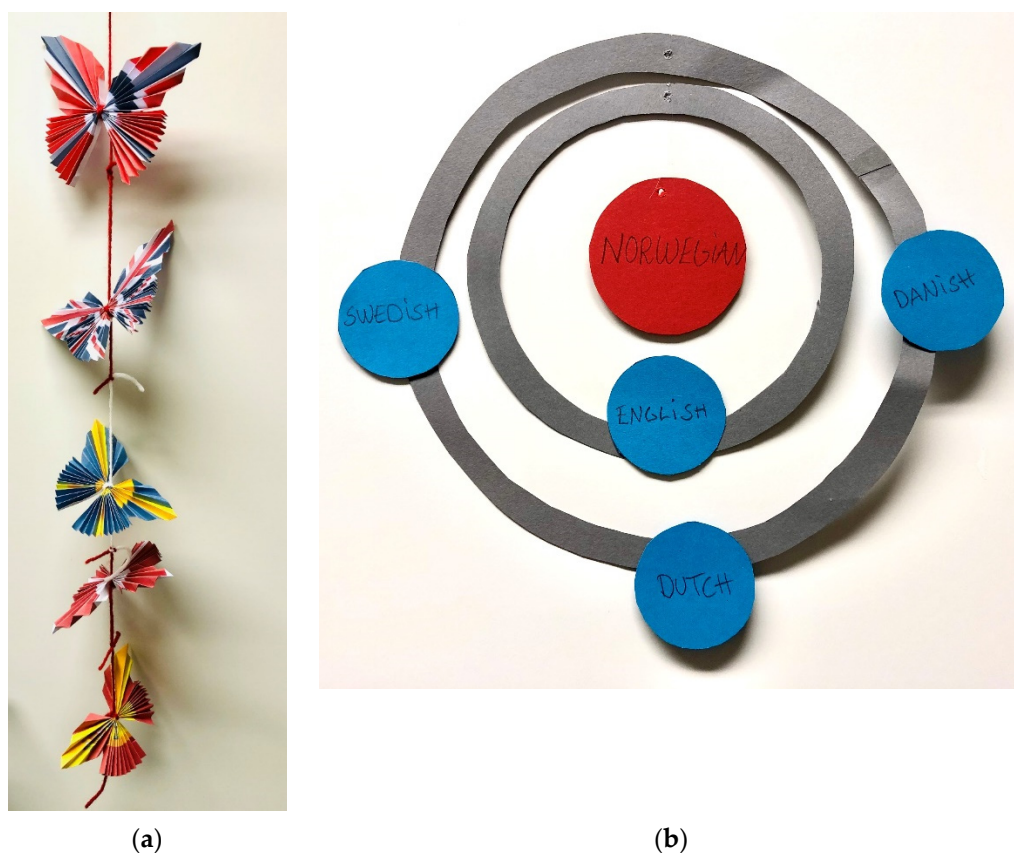

(**a**)   (**b**)

Figure 2. ST8's (**a**) and ST14's (**b**) DLC artefacts.

The printed flags on the butterflies of ST8's artefact signify languages. The flag is a common symbolic representation of language, despite its monolingual, nation-state associations. It is interesting that of the fourteen STs studied, only four used flags to represent languages (ST8, ST6, ST12, ST13).

Other representations were chosen specifically for their potential to describe the STs' visions and experiences of their language repertoires and DLCs. For example, ST1, ST2, and ST3 (Figure 3) each chose a tree and used the roots and trunk to place their DLCs; as ST3 explained, 'because I think of Norwegian and English as my roots'. ST3 used the positioning of the leaves and different shades of green to describe her relationship with her languages: 'Danish and Swedish, are in a paler shade of green as I do not have a strong relationship with these languages'. Similarly, ST1 placed Polish, her mother tongue, at the bottom of the tree trunk, slightly lower and in a different colour than English and Norwegian. The use of a striking, highly visible colour, such as red, gives Norwegian emphasis and importance, and the action of plunging the language deeper into the earth associates this language with her roots, her background, and the depth of emotion.

| (**a**) | (**b**) | (**c**) |
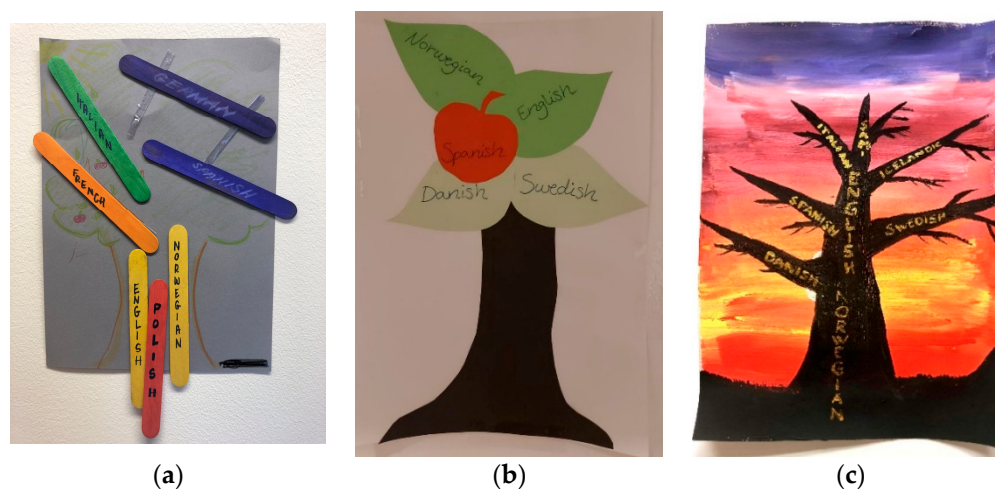
Figure 3. ST1's (**a**), ST2's (**b**), and ST3's (**c**) DLC artefacts.

ST8's artefact (Figure 4), a heart with paper garlands, symbolises how choices reflect the language learning journey, language connections, and contribution of language families, in this case, the Germanic languages, to developing the ST's language repertoire. Even though Latvian, pertaining to the heart (mother tongue), and Russian, both languages acquired in natural contexts, are separated from the three other languages learnt in educational contexts, the paper garlands are all attached to the heart, thus creating a holistic yet complex story of connection through experience and place. Furthermore, the colour choices and sequencing of the garlands are an analogy for language interdependence. German, English, and Norwegian, all identified as foreign languages, are purposely depicted in yellow, blue, and green, as 'German (yellow) and English (blue) were a base for learning Norwegian (green)' (ST8). Even though this artefact seems to reveal the ST's DLC as Latvian–Russian, and the narrative focused on the learning experience, the sociocultural and geographical reality of place and profession reflects a Latvian–English–Norwegian DLC. Ironically, both English and Norwegian are described as foreign languages, yet they are languages the ST is obliged to use on a daily basis in their current living context. The artefact, narrative, and reality of the ST's professional context depict the ambiguity of multilingual living: language distance (Norwegian is furthest away from Latvian), based on chronology and the ST's life choices, is depicted in the artefact and the narrative yet does not mirror the ST's actual language use. The personal and creative expression of the intricacy and complexity of lived and subjective experience reveals life lived in the interstices of languages, places, and identities.

Figure 4. ST8's DLC artefact.

ST12 chose to create a book that encapsulated his languages (Figure 5). For this ST, 'books are synonymous with knowledge and learning, which made a book feel like a natural fit for languages'. However, this ST 'wanted the inside to be very personal for my own language journey. I decided to draw things of great importance to me within each language'. The use of the word *'within'* gives the impression that languages carry ideas and feelings, and the DLC artefacts reveal these emotions and experiences. This is evident in ST12's meticulous choice of objects to express his relationship with, and experiences in, the languages. Norwegian is a house, 'family home, as Norwegian really does feel like the language of home and one of the things that ties me to my family and local friends'. English is the language of 'fun' and entertainment, hence the drawings of consoles and gaming. Chinese, the language the ST is learning 'actively in my free time', is depicted by the Chinese apps used to learn the language and keep in touch with Chinese friends. German is connected to the ST's love of metal music, and for Dutch, the bicycle and beer reflect his experience as an exchange student in the Netherlands.
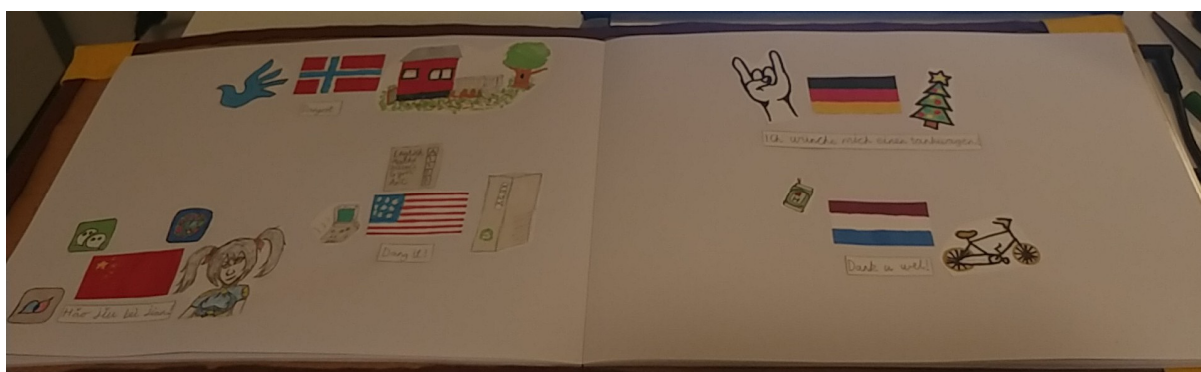

Figure 5. ST12's DLC artefact.

3.1.2. Personal and Symbolic Choices in the Creative Process: Shapes, Sizes, Colours, Layout

The choice of materials for creating the DLCs was overwhelmingly coloured card, which the author was able to offer the STs. However, the personalization of the artefacts occurred through the creative process, in the deliberate choices of shapes, sizes, colours,

layout, and arrangement/layering of the different elements that constituted the final artefacts. This process was described in the narrative as an intentional act of identifying the different roles languages play, and have played, in each ST's life trajectory.

For example, ST6 and ST7 chose hearts (Figure 6) as a metaphor for their love of languages, yet the shapes, sizes, and colours selected portray each ST's personal relationships and journeys with these languages. ST6 arranged five hearts in three rows of 1 + 2 + 2 hearts, in decreasing size and in different colours per row. Each row illustrates a different language group and a different language relationship. This layering also increases the distance between the languages in terms of frequency of use, proficiency, and learning context. The symbolic choice of colour in this artefact is especially important, as colours are considered signifiers (Tabaro Soares et al. 2021), carrying 'a set of affordances from which sign-makers and interpreters select according to their communicative needs and interests in a given context' (Kress and van Leeuwen 2002, p. 355). Norwegian, the ST's mother tongue, is the biggest heart and is 'designed in a blue heart. Blue is my favorite color, and therefore I thought it would fit my first language'. The next row consists of slightly smaller hearts in orange. These represent English, which the ST studied in school ('I've learned it for 13 years now') and used 'in my everyday life, mostly through the internet and television', and Swedish, which she used with family members. The ST considered these languages to be her second languages ('I consider Swedish as my second language, just like English'), and hence, Norwegian, Swedish, and English constitute her DLC. The third row, in even smaller hearts and in green, captures the ST's two least-used languages, and those in which she had the lowest proficiency. The ST explained her use of green: 'green is a color I don't like that much, and therefore it is on the bottom with Danish and German–The languages I know the least'.
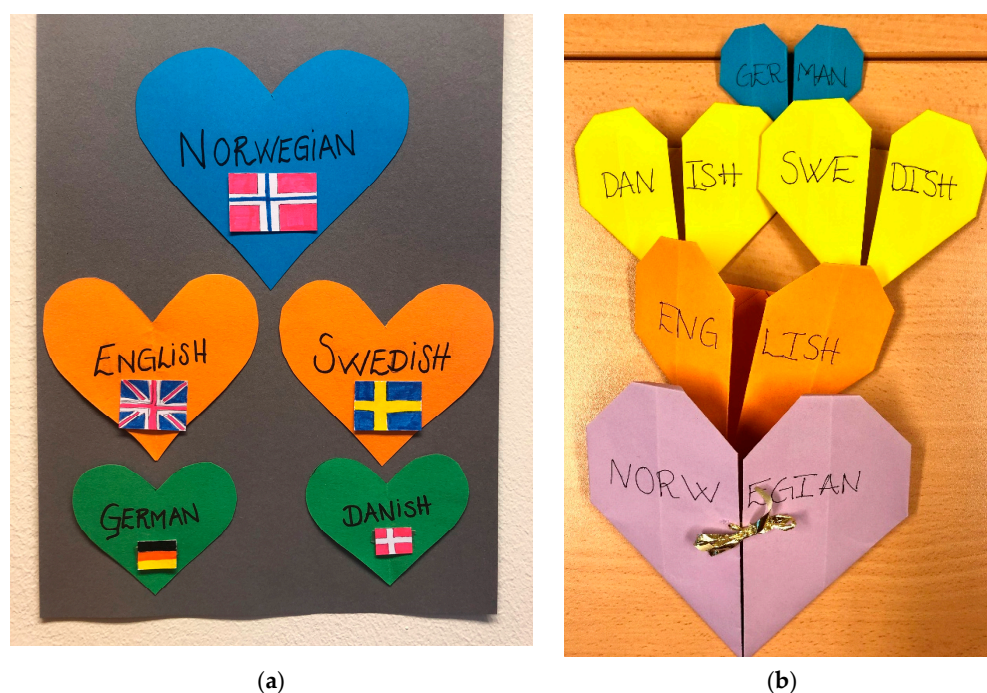

Figure 6. ST6's (**a**) and ST7's (**b**) DLC artefacts.

ST7 created a similar structure, origami nested hearts, also in different colours and sizes in four rows, with English occupying the second row on its own. The other languages, Swedish and Danish (third row) and German (fourth row) represent languages that the ST may have understood but did not speak. In the ST's words, 'I wanted them to be in different sizes because of how well I know and understand the languages. The different colours is the same as the sizes, and they are different except from Danish and Swedish

that are the same size and same colour because I know them and understand them the same amount'.

ST5's DLC mobile with circles and hearts (Figure 7) also reflects this layering of languages as constituent of language distance and a source from which the DLCs emerge. ST5's narrative was interesting, as it decentred the expected distance in the layering of the languages. For example, Norwegian and German are far apart, yet they are both represented by heart shapes, which expresses the ST's enjoyment of learning both languages, 'because Norwegian was my mother tongue and German was fun to learn'. Even though English, Swedish, and Danish are at the same level, just below Norwegian, they are all, together with French, at the bottom of the mobile and with the longest string, categorised as languages the ST had to learn at school. In this case, the ST did not identify proficiency but did separate English and Norwegian from the full linguistic repertoire 'because I speak them pretty much fluently', hence identifying a two-language DLC.

Figure 7. ST5's DLC artefact.

ST13 (Figure 8) described the action of updating her DLC by adding colour and size to the representative drawing of German, which she had deliberately left in black and white as a symbol of a language to which she did not feel a strong connection. The ST explicitly stated that 'the language is a part of my language repertoire; however, I do not consider it as a part of my DLC'. Therefore, the drawing lacks colours. In contrast, the languages that appear in bright colours represent her emotional attachment to people, place, and experience (Ibrahim 2014, 2019), as the ST described, reproduced below:

- People: Latvian–Since exchanging letters with my grandmother has always been in Latvian (and still is); Russian–Russian is associated with my father, who consciously encourages our written and spoken conversations to be in Russian; Polish–is represented as a heart because of the romantic connection I feel to the language, and

the colours are bright as it is a language I use the most at home. In addition, the heart shape has been chosen to illustrate the connection to the Polish relatives on my mother's side;

- Place: Norwegian–In addition to learning Norwegian at school, I learnt most of it at badminton trainings, where I could explore the dialect and talk in a more natural manner beyond the classroom;
- Experience: English–English is a language I started learning in the third grade. However, I mostly associate the language with pop-music, since I always looked up the lyrics and sang along to my favourite English songs. Therefore, English is represented with musical notation.

Figure 8. ST13's DLC artefact.

3.2. Engaging with the Multilingual Self and Implications for Classroom Practice

One of the main results of this study was the STs' discovery of a multilingual self or perceiving themselves for the first time as multilingual. This is evident in comments, such as the following:

- Creating my DLC made me realise that I know more languages than I think I do. I have always thought that I only knew one language, Norwegian, but through the process of creating my DLC I realised that I do know more languages than I thought (ST11);
- From the DLC I learnt that I am multilingual (ST3);
- I think this made me acknowledge more languages, and that will help me visualise my multilingualism and see myself as a multilingual individual and multilingual teacher (ST5);
- By creating this atom to visualise my language repertoire I realised I know more than I thought I did. I was not aware that I knew 5 languages (ST14);
- By creating my own DLC I felt inspired by the linguistic story that this language map illustrates (ST2);
- The DLC helped me think of myself as a multilingual individual as it made me focus on my relationships with language (ST2);
- I have not seen myself as multilingual (ST7);
- I have already seen myself as a multilingual individual but creating the visual representation of all my languages made me even more sure about it (ST1).

As a result of using DLCs as a pedagogical tool in an educational context, the STs envisioned a classroom scenario where other languages were welcome, and could be

used as teaching and learning resources. The STs visualised a future imagined classroom community, which prioritised multilingual awareness, inclusion, and proactive visibilising of students' languages. Their comments below also intimate a reciprocal approach in creating a safe multilingual learning environment, as one ST even considered learning words from the students' languages to enhance the process of inclusion:

- This assignment (and our recent sessions) have given me additional motivation to pursue multilingualism in my own classroom when I start teaching. (ST12);
- The activity invites pupils to express themselves visually and creatively, meaning that they could express feelings that are hard to describe in words. As an example, the pupils could create a DLC in their 8th grade and then edit it in their 10th Year to see if and how the interrelation between the languages has changed (ST13);
- As a teacher I want to acknowledge the different languages children have and maybe have them use it as a steppingstone to learn English and other languages (ST4);
- I can use this to help my students learn English by helping them see the connections and similarities between their own language and English (ST11);
- I would also try to learn a few words if it's a language I don't know so everyone feels included (ST3).

Creating DLC artefacts involved purposeful kinaesthetic activities, such as cutting and shaping card, drawing and colouring chosen objects, and sticking, attaching, and layering string and wooden ice-cream sticks. This physical interaction with STs' multiple languages not only uncovered their subjectively lived multilingualism but also initiated a transformative process in developing their future professional identities, which is further elaborated in the next section.

4. Discussion

This study explored STs' engagement with their DLCs and linguistic repertoires through an innovative creative approach to DLC modelling, that is, creating DLC artefacts. First and foremost, the STs engaged positively with this visual/artefactual activity, rendering their language repertoires and DLCs concrete, visible, and tangible. For example, they commented, 'Creating this constellation has been a great experience for me' (ST12) and 'It was fun to illustrate my languages and while I was doing it, I wanted to be able to add more languages' (ST2). The STs were able to engage with a wider group of languages and skills that went beyond, complemented, and interacted with their DLCs. This expansion of linguistic knowledge allowed for reflections on the characteristics of multilingualism as dynamic, porous, and dependent on individuals' shifting language biographies and life trajectories (Blommaert and Backus 2013), with differing competences and proficiencies across closed language systems and domains (Grosjean 2010). It decentred the notion of language proficiency, thus centre-staging plurilingual knowledge and mediation (Council of Europe 2020). ST10 (Figure 9), depicting the interconnectedness of the language repertoire and DLC through planets, appreciated his expanded language repertoire: 'Nice to see how big my language repertoire actually is, it's not limited to the languages that I actually can speak–it can include the languages that I'm not good at'.

As we can see from the results, a plurisemiotic analysis of the DLC artefacts highlights the following areas: the interrelatedness of the language repertoire and the DLCs; DLC artefacts as creative and discursive pedagogical tools for engaging with multilingualism in teacher education; the visibilising of the full language repertoire for exploring language connections, emotions, and identities; and the potential impact on and issues related to classroom practice of multilingualism and plurilingual practices.

Figure 9. ST10's DLC artefacts.

4.1. The Interrelatedness of Language Repertoires and DLCs

This study expanded the activity of DLC mapping and modelling (Aronin and Moccozet 2021), as it embedded DLCs in the language repertoires of the STs, thus extending their perceptions of themselves as multilingual. For the STs, the physical process of creating DLC artefacts began the process of identification as multilingual individuals and future teachers through reflecting on their experiences of lived and subjective engagement with languages. These artefacts allowed for the interplay between the full linguistic repertoire and more context-specific DLCs. They revealed the evolution and unpredictability of DLCs as life circumstances change (ST13 and ST8), where 'it would appear that the DLC is constantly in flux, subject to social, cultural, and temporal changes, the latter of which may be long- or short-term' (Nightingale 2020, p. 244). The STs described a process by which their DLCs emerged naturally in the creative and discursive possibilities of the artefact as a pedagogical tool and fine-tuned their multimodal narratives with artistic choices of size, colour (or absence thereof), materials, and objects.

Even though flags and objects may have essentialist cultural-national links, it was the positioning or layering of the different languages that decentred hierarchical attitudes and monolingualizing processes. The embeddedness of the DLC constructed a more complete, albeit complex, story of connection with people; of places, not only geographical, but also learning, travelling, and intercultural spaces; and of holistic experiences.

The DLC artefacts confirm that 'language choices depend not only on level of proficiency, but on the particular language identity that individuals choose to foreground momentarily in diverse situations, and the communicative need of the immediate sociocultural context' (Ibrahim 2022, p. 37). ST13 expressed the ongoing linguistic dynamism of the DLC artefact as follows:

> The artefact is fixed, it represents the current situation, meaning that it would not display any changes if the correlation among the languages would switch. To exemplify, if I would like to teach German at some point, I would have to continue both development and practice of the language, meaning that at some moment the representation of German could become colourful, as well as brighter and bigger in size.

4.2. DLC Artefacts as Creative and Discursive Research and Pedagogical Tools

The creative process of constructing the DLC artefacts afforded the STs agency as they appropriated the tool, at both research and pedagogical levels. The creative approach helped the STs embrace their full language repertoires and identify the parts that contributed to the whole. An 'umbrella identity' (Fisher et al. 2020) 'encompasses, but in important ways, transcends a person's language-specific identities' (Henry 2017, p. 548). The STs constructed linguistically richer selves in the process, thus attesting to the transformative power of arts-based methods in language teacher education (Whitelaw 2019).

Given the freedom to choose the artistic materials and the concrete outcome, the STs externalised their language relationships, giving them a tangible, visible reality that altered their perceptions of their linguistic selves. This activated a reassessment of not only the self but also acquired language ideologies, beliefs about languages in education, and linguistic social justice. As an extension of DLC modelling, which pre-determines the materials and the outcome, the creative and physical process of connecting languages with string, paper garlands, glue, and tape, the process of layering the languages according to relationships and experiences, and the choice of colour and shape further emphasised these subjective relationships. The interplay between shapes, sizes, and colours and the subjective layering of linguistic experiences created an eclectic yet holistic relationship with the full language repertoire. These details were also what allowed for the emergence and identification of the STs' DLCs.

As with DLC modelling, the materiality of the artefact served as a 'cognitive extension and a material symbol of one's own sociolinguistic existence, skills, and languages used, all these against the background of social reality' (Lo Bianco 2020, p. 37). It also extended the potential of a metaphorical perspective on the creative choices in STs' relationships with the languages. The physical activity of creating the artefact changed the STs' relationship with their languages, as was evident in their reflections.

Ultimately, the artefacts and the written narratives complemented each other, enhancing each other's meaning-making, thus overcoming the limitations of each mode (Tabaro Soares et al. 2021, p. 25) and contributing to the 'unravelling of narratives of identity and language' (Bristowe et al. 2014).

4.3. Visibilizing the Full Language Repertoire

By engaging with their full linguistic repertoires, which included their DLCs, additional languages, languages they had forgotten, languages they only knew a few words of, languages they did not currently use, and languages they had not even started learning, the STs came to the realization that they were multilingual. Their reflections on the process of visibilising their multilingual repertoires pointed to a positive engagement with their multilingualism and impact on their developing identities as multilingual primary teachers. This has implications for classroom practice, as the STs' positive engagement with this visual, tangible activity encouraged reflection on the classroom implications in a context of increasing linguistic diversity in Norway. This visibilising process allowed the STs to position themselves as multilingual vis à vis their language repertoires and encouraged them to engage with heteroglossic practices, linguistic biographies, and the interconnectedness of language. This transformative process altered perceptions of the linguistic self and increased the potential for integrating a plurilingual perspective in future classroom practice.

As this was a predominantly qualitative study, an exploration of STs' engagement with subjective, lived multilingualism via visual methods and narrative self-reporting was appropriate. However, these were pre-service teachers with very little agency in the classroom in their teaching practicums. Therefore, it is impossible at this stage to deduce from this study how these experiences of engaging with multilingualism will impact their classroom practice in the future. Even though their comments allowed for a glimmer of hope that the artefactual elicitation of biographical narratives had brought down some language barriers and started the process of normalizing multilingualism, more classroom-based research into engaging teachers' multilingual selves is necessary. In addition, a longitudinal approach would also more fully capture the evolution of individual and group DLCs and of shifting relationships with their languages.

5. Conclusions

This innovative conceptualization of the DLC in teacher education extends its potential as a pedagogical tool and identity artefact, thus establishing an intricate and dynamic relationship between language repertoires and DLCs. In attempting to answer the research

questions, this study has foregrounded three main areas relating to the creation of DLC artefacts: the potential contribution of DLC artefacts as research and pedagogical tools in linguistically diverse classrooms; the symbolic, even metaphorical affordances of the creative process in engaging teachers with subjectively lived multilingualism; and eliciting narratives on the abstract concepts of multilingualism and identity, which reflect potential transformative processes in the identification of the STs as multilingual individuals and future multilingual teachers. In Aronin's (2021, p. 37) words, 'the embodiment of one's personal linguistic life and communal linguistic practices in a tangible model turns out to be not only entertaining but also useful for adult multilinguals, educators and researchers who participated in this activity'.

Ultimately, this method of representation that employs visual, artefactual, and verbal tools gives STs a multilingual voice to bring to the classroom, which can contribute to decentring the monolingual and monoglossic premise of language education and start undoing the shackles of decades of monolingualizing processes. The DLC artefacts enable researchers and teacher educators to access and understand the multilingual voices, identities, and experiences of pre-service teachers, thus creating 'the ideal "learning trance", a state in which time flies and fun is being had alongside the learning' (ST12).

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